

## **Remarks**

### **Claim Amendments**

Claim 1 is further amended to conform the claim language to the previous amendments, by deleting the phrases “y is 0 or 1;”, “or YZL' groups”, and inserting thereafter the term —group—. Further, the term —or— is inserted before “heteroatom” as suggested.

The Applicant thanks the Examiner for pointing out these errors, and requests that this rejection be withdrawn.

### **Section 112, ¶ 1 Rejections**

The Examiner rejected again the claims under 35 U.S.C. § 112, ¶ 1 as not being enabled. The Applicant respectfully traverses, as it is believed that the Examiner has mis-read and/or mis-characterization of Applicants Remarks dated May 27, 2004.

In the Office Action of July 7, 2004, at page 2, at # 3, The Examiner states that “as applicants admit, ‘most all other parameters of the polymerization process’ were not otherwise kept constant”. The Applicant believes that this statement is a mis-reading of the Applicant’s prior Remarks.

At page 6, last paragraph, of Applicant’s Remarks in the May 27, 2004, the Applicant states:

As summarized in Table 1, Example 3 was performed at 80°C, while Examples 4, 5 and 6 were performed at 85°C. As the Table 1 shows, most all other parameters of the polymerization process are constant between the Example 3 and Examples 4, 5 and 6. The increase in temperature demonstrates the decrease in molecular weight distribution of the polyethylene generated therefrom from the value of 43 (at 80°C) to 24.2, 24.1 and 25.4 (at 85°C). Example 7 shows a similar trend, but the C<sub>6</sub>/C<sub>2</sub> mole ratio is different in that example, exemplifying yet another embodiment of the invention. (emphasis added)

Thus, the Applicant believes that the Examiner has mis-read the Applicant’s statements, as the data in Table 1 does indeed show that the reaction parameters other than the reactor

temperature— $C_2$  level,  $H_2/C_2$  ratio,  $C_6/H_2$  level, molar ratio—are constant. There are of course minor differences in some of these reactor parameters; for example, between Example 3 and 4 the  $C_6/C_2$  ratio goes from 0.0074 to 0.0073, etc. Yet, it can be seen that these differences are so minor as to have no major influence on the MWD; for example, when comparing Examples 4, 5 and 6, one finds minor differences in the  $C_6/C_2$  ratio, but no significant difference in MWD (given the known error in GPC measurements of molecular weights). The Applicant contends that one skilled in the art would clearly see the influence of reactor temperature variation of  $5^\circ\text{C}$  on MWD, which is quite significant, as indicated by the very fact that the MWD varies from Example 3 to the Examples 4, 5 and 6, while the MWD between Examples 4, 5 and 6 remains relatively constant.

It should be noted that, other than the items mentioned above, the remaining items listed under “Example” in the far left hand side of Table 1 are all measured quantities, mostly from the polymer generated itself, not quantities that are controlled by the experimenter directly.

Further, the Examiner states that “one poorly-executed showing of a change in temperature of 5 deg C (along with changes in other parameters) is scarcely enough to demonstrate a universal trend or correlation between reaction temperature and molecular weight distribution of the polymer produced.” (page 3 of Action dated July 7, 2004). The Applicant does not agree with this statement. As discussed above, as the Applicant believes that the present invention has been demonstrated adequately, and thus enabled.

As per the MPEP § 2164.05 (Rev. 2. May 2004), the Applicant “must demonstrate by argument and/or evidence that the disclosure, as filed, would have enabled the claimed invention for one skilled in the art at the time of filing”. The Applicant contends that enablement has been demonstrated, and requests that this rejection be withdrawn.

### Section 103 Rejections

The Examiner maintains the rejection of Claims 1 through 22 under 35 U.S.C. § 103(a) as obvious over *Sugimura*, as well as the rejection over *Sugimura* in view of *Liang*, *McConville* and *Schrock*. The Applicant traverses these rejections, as (1) all claim features have not been disclosed in the art as required for a *prima facie* case, and (2) the unexpected nature of Applicant's invention. The Applicant thanks the Examiner's clarification by phone that these rejections were deleted from the last Office Action due to an oversight.

First, the Examiner cites certain structures in *Sugimura* as rendering Applicant's claimed invention obvious. The MPEP states that the Examiner should "[c]onsider the predictability of the technology". MPEP § 2144.08(e) (Rev. 2. May 2004). Further, it is stated that if "the technology is unpredictable, it is less likely that structurally similar species will render a claimed species obvious because it may not be reasonable to infer that they would share similar properties." *Id.* (citing *In re May*, 574 F.2d 1082, 1094, 197 USPQ 601, 611 (CCPA 1978)). Given the unpredictability in the catalyst arts, the Applicant contends that these disclosures alone do not render the Applicant's claimed invention obvious.

Even if true, the Examiner's statement regarding bonding to titanium does not render Applicant's claimed invention as a whole obvious. The Examiner must consider all claim limitations. MPEP § 2143.02 (Rev. 2 May 2004) (citing *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)). In particular, the Applicant maintains that the prior art of record does not disclose or suggest the claim feature "wherein raising or lowering the reaction temperature narrows or broadens the Mw/Mn of the polyolefin, respectively", especially in conjunction with the claim as a whole. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art". *Id.*, (citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). The Applicant contends that the Examiner has not shown such a teaching or suggestion in the prior art.

The Applicant also contends that the present invention is unexpected in light of the art available at the time of the invention. In support of this, the Applicant herein submits a

Supplemental IDS, along with *Liang* already cited by the Examiner, to references showing trends in the molecular weight of polyethylenes as a function of polymerization temperature for various types of catalysts. These references indicate that there is no trend from one group to type of catalyst to another that would render Applicant's claims obvious. See MPEP § 2143.02 (Rev. 2 May 2004) (evidence of nonobviousness). The Table below summarizes the individual trends disclosed in each case, highlighting the lack of predictability between the various catalysts studied.

**Table: Molecular weight versus polymerization temperature  
in olefin polymerization catalysts**

| reference                                   | catalyst type               | temperature trend | molecular weight trend |
|---|-----------------------------|-------------------|------------------------|
| <i>Eskelinen et al.</i> (1996)<br>(table 1) | bulky ligand<br>metallocene | ↑                 | ↓                      |
| US 5,608,019<br>(col. 13, ls. 55-67)        | bulky ligand<br>metallocene | ↑                 | ↑                      |
| <i>Kang et al.</i> (1999)<br>(page 3761)    | pyridine diamine            | ↑                 | ↓                      |
| <i>Liang et al.</i> (1999)<br>(table 1)     | metal-diamine               | ↑                 | → (no trend)           |
| WO 99/01460<br>(table 6)                    | metal-pyridine-<br>amine    | ↑                 | ↑↓                     |

These references show that, at the date of Applicant's invention, there was a high degree of unpredictability in the effects of polymerization temperature on the polymer produced, and that any trend at all is isolated to a only certain catalyst precursors or certain processes. In particular, *Liang et al.* does not disclose a discernable trend when comparing runs of the same "equiv", for example, no.s 4 and 12, and no.s 6 and 7, wherein the initial temperature was different between the two runs by 20°C. The Applicant can find no hint in *McConville* or *Schrock* to any use of reaction temperature to control polymer properties.


Given both (1) the lack of disclosure of the claim limitation "wherein raising or lowering the reaction temperature narrows or broadens the Mw/Mn of the polyolefin, respectively" in the

art cited by the Examiner and (2) the unexpected results of Applicant's invention, Applicant contends that the claimed invention would not have been obvious to one skilled in the art at the time of the invention. The Applicant thus requests the withdrawal of these rejections.

It is submitted that the case is in condition for allowance. The Applicant invites the Examiner to telephone the undersigned attorney if there are any other issues outstanding which have not been presented to the Examiner's satisfaction.

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